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An Examination of the Objections urged against the plan of Decimal Coinage proposed by the Royal Commissioners and by the Select Committee of the House of Commons. By CHARLES JELlicoe, Esq., one of the Vice Presidents of the Institute of Actuaries.

[Read before the Institute, 26th March, 1855, and ordered by the Council to be printed.]

IT is now somewhat more than twelve months ago that the decimal coinage question was brought under the notice of this Institute, and that a resolution was thereupon unanimously come to approving of the plan recommended by the Committee of the House of Commons. Since that decision, public attention has been repeatedly called to the subject; and although various plans have been proposed and discussed, founded on a different basis from the one thus recommended, it must, I think, be conceded, that none of them have made any serious impression on the public mind, but that, on the contrary, the one proposed by the Committee has made some if not considerable progress in the course of the sifting which the question generally has undergone.

Aided by the powerful efforts of the Decimal Association, it is probable that this progress would have been more decided, but for the distraction created by the arguments in favour of other plans, the strenuous exertions made by the supporters of them, and the oft repeated objections to the proposition of the Committee, to be met with in the speeches and publications of these adverse parties.

That there is a certain force in some of these objections I do not mean to deny, and am quite ready to allow them their proper weight; but the majority of them may, I think, be shown to have no foundation whatever, or, to say the least, in many cases to be built upon a very slender one. As it is extremely desirable that the question be brought to issue as soon as practicable, and as the exposure of any fallacies connected with it must have a tendency to promote that object, I propose now to examine briefly such statements put forward by recent writers as appear to me to be erroneous, and calculated to impress the public mind with false ideas upon this important subject.

Mr. Theodore W. Rathbone has been amongst the most active and energetic of the opponents of the Committee's plan, and most earnest in the recommendation of one of his own; and it may be well, therefore, to begin with some of the arguments of that gentleman. At page 9 of his *Comparative Statement* he says—

"Now a very serious objection arises in the first instance to this millesimal division of the pound, from the *form of account* which is proposed, and which it necessarily involves; and it may be questioned whether this one requirement would not of itself render the loss to the country, to say nothing of the inconvenience, greater than any possible gain from a decimal, or rather millesimal, system such as this. In the words of the little work lately published by 'One of the Million,' 'the commonest, and certainly the most laborious, work of an office, is *addition*; and the great defect of the present system is the necessity of dividing the pence by twelve, instead of reckoning them by tens:' but to this principal and most laborious work of ordinary accounts, the scheme under consideration, by bringing in a fourth or mil column of figures, adds unavoidably upwards of five-and-twenty per cent. Regardless of the evidence on this point of even their own witnesses—(Mr. Miller, a cashier of the Bank of England; Mr. Bevan, a private banker, &c.), who distinctly told the Committee '*that it would be exceedingly inconvenient in large transactions to force farthings or mils into the calculations that we should have to deal with; that there would be an objection, and a strong feeling, against the introduction of farthings into mercantile accounts*'—the plan recommended in the Report renders this wholly inevitable in *all* accounts, large and small. The necessary form of account on this plan rendering the next denomination to the *mil*, the *cent*, consisting of twopence and two fifths of a penny (almost $2\frac{1}{5}d.$), it would be altogether impossible to deal with *mils* as at present with farthings and halfpence, and to make the proposed *cent*, like the penny, the lowest denomination in our ordinary accounts; and hence we must evidently have, as proposed in the Report and by all the advocates without an exception of schemes on this basis, an additional *fourth* money of account and column of figures to add up and deal with in *all* our accounts—consisting either of farthings, or the still smaller amount, the *mil*—also no aliquot part of pence, or halfpence, or farthings. Great as would undoubtedly be the advantage in so many points of view of that universal labour-saving machine, decimal coinage and numeration, it is surely questionable whether they would not be more than all thrown away by this one unfortunate and egregious inconsistency with a real and perfect decimal system of accounts."

The objections here made are greatly exaggerated. There can be no doubt that in all transactions on a large scale mils would be disused: it is probable that they would not be taken any account of in Banks or Insurance Companies, several of which latter institutions make their charges, as it is, in not less fractions than three-pences. But were it otherwise, the labour would not be increased one fourth,* as Mr. Rathbone asserts, since the mil would only occur here and there. We may imagine, for instance, that an ordinary column of sums for addition would appear as follows:—

40	7	„	„
20	3	4	5
17	8	6	„
54	7	9	3
19	5	7	„

* Were the labour augmented as Mr. Rathbone imagines, it would be increased one third, not one fourth only.

the sums set down for the most part not including mils at all. Mr. Rathbone will surely admit that the additional trouble here is balanced by having tens only to carry, instead of 12 and 20. As regards the actual coinage, the labour of counting would be greatly reduced, since halfcrowns, shillings, sixpences, fourpenny and three-penny pieces, and pence, might ultimately be withdrawn, leaving only four varieties necessarily to be dealt with. On this head the plan proposed by Mr. Rathbone would break down altogether; for if the coinage consisted of pence and tenpenny pieces only, a banker receiving such a sum for instance as £50. 4s. 6d. would have to count upwards of 1,220 coins, instead of 59; and this could be avoided only by retaining the pound in his scheme, in which case the accountant would have to divide his additions of one column by 24, a more inconvenient divisor than either of those existing at present.

Throughout his pamphlet Mr. Rathbone insists on the insuperable difficulties arising out of the circumstance of the new coins being incommensurable with the old, and states that "the former must be suddenly introduced, as the two will not work together." It is to be presumed that this means, that the new must be made at once to supersede the old; or, in other words, that the latter must be suddenly withdrawn. This is quite a misapprehension. It is proposed at first merely to issue cent and mil pieces, calling in those which it is intended shall thus be superseded as the new coinage comes into use. In a short time there will be cents' worth and mils' worth of all kinds of articles, as there are now fourpenny and pennyworths; and as the new least coin will be of less value than any now in use, the poorer classes will thus get more accurately adjusted values for their money than they did before. As for such fixed charges as postage rates and tolls, the old coinage will remain applicable to them till the requisite changes in them be effected; and it must be borne in mind, that even here no great inconvenience will arise, except only where single pieces are concerned—thus, a dozen penny stamps will be purchasable for 5 cents or 50 mils, and a sixpenny cab fare can be paid with two cents and five mils. It is not denied, however, but that during this transition state some embarrassment will arise, nor can any change whatever be made without; it is the natural penalty to be paid before a better order of things can be attained, and for the purpose in question the payment of such a penalty is well worth the while. The principal inconvenience, however, will arise in accounting. Thus, bankers and others will no doubt

receive coins of the old and new denominations at the same time, and will have to pay cheques and bills drawn in both currencies. But a little management will suffice to remedy in a great measure any complication which may arise from these sources. It will be necessary only to add in account books as now constructed one column for the new system of coinage, and make the entries accordingly. Such an arrangement as the following, for instance, would meet any temporary difficulty of this kind:—

	£.	s.	d.	£. f. c. m.
A. B.	25	7	6	
C. D.	..	..	..	100·730
E. F.	16	8	6	
G. H.	..	..	..	50·682
I. K.	..	..	..	75·350
	152	16	0	226·762

The totals in each case being ascertained, the shillings and pence can be easily converted into corresponding values in the new system, and the sum of the whole then taken in that character.

It is not very easy to understand the object of the passages quoted from Mr. Laurie's work by Mr. Rathbone, and which he appears to look upon as of vast importance, but which, probably, few other persons with a knowledge of the subject will regard as of any. In one portion of them, complaint seems to be made that some of the present coins can be expressed in decimals of a pound only by a great many figures; and in another,* great evils are said to arise from our not having coins of smaller value than those now existing. These objections apply to the present system, but they are precisely those which will be remedied by the proposed one. Considering that Mr. Laurie, according to Mr. Rathbone's account, "was one of the most wonderful men that ever lived, as regarded his knowledge and application of figures," that gentleman seems to have derived remarkably little support from him.

Dr. Gray and Mr. Minasi, as well as Mr. Laurie, have both endeavoured to conjure up some frightful consequences attendant upon the sacrifice of what they term the "poor man's penny." From these gentlemen's statements it might be supposed that all sorts of articles in general use would still be made up in pennyworths, and multiples of pennyworths, whilst the poor man's pocket contained nothing but cents and mils; or that the shopkeeper would have coins only of one system, whilst his customer had those only of the other. Nothing can be really more fallacious than this.

The poor man will make his purchases, probably, having shillings, pence, cents, farthings, and mils for the purpose, and the shop-keeper will have a quantity corresponding with either of them. Let us suppose that a portion of some article of commerce has been cut off from a larger quantity, and that, being weighed, its price is proportionately not quite a farthing more than was required: will it be denied that the mil is other than a convenience in such a case, and that it will tend rather to save the poor customer from loss? If the necessities of life were still to be sold at prices indicated by our present coinage, whilst the purchaser had only the new in his possession, there might be some weight in the objections thus raised; but that not being the case, they fall wholly to the ground. The effect of the change will be much the same as that which a foreigner experiences on his first arrival. His embarrassment in making payments ceases directly he has obtained our coins in lieu of those of his own country; and so it would equally cease if we changed our charges to suit his coins. The result of the whole matter is, that during the transition there will be a greater range of prices and a corresponding variety of pieces with which to meet them—in other words, that there will be increased facilities of exchange.

But a real difficulty which will arise has been in a great measure overlooked by these gentlemen. They have omitted to observe that where an old charge—such, for instance, as one for rent or taxes—is made in the new currency, doubts will arise in the minds of unskilled persons as to whether the one is really an equivalent of the other; they will not readily see, for example, that £25.375, or twenty-five pounds three florins seven cents and five mils, is really the equivalent of £25. 7s. 6d., and it will, no doubt, take some time to make this apparent. On the other hand, it must be remembered that these cases will not occur to the same individual every day—that when they do he will have ample time to consider them—that he can pay the old sum in the old coin, at least till he has become more familiar with the new; and that meanwhile he will have abundant means of resolving his doubts by such contrivances as tables of equivalents and “ready reckoners,” of all sorts and sizes, which the exigences of the time will, we may be sure, abundantly call forth.*

From the foregoing considerations we may observe, that no

* Two publications of this kind have already appeared—one by Mr. Robert Mears, and another by Mr. Walford. They are both very ably got up, and are calculated to be of much practical utility, should the proposed change take place.

embarrassment will arise except where a price in terms of the existing coinage has to be translated into terms of the proposed one; and as this necessity need never arise in ordinary buying and selling, where quantities will adapt themselves to either system, no inconvenience, as I have already said, need be anticipated in such transactions. But where the terms must be translated, another alleged difficulty presents itself, which has been much insisted upon by Mr. Minasi. Those who are familiar with such matters are well aware that some of our present pieces cannot be represented as decimals of a pound in less than four or more figures; and since the new system will have coins corresponding with three places of decimals only, it becomes impossible, with two exceptions, to represent the one exactly in terms of the other. Thus, decimally—

1 penny	=	·004166	+	of a pound.
2 pence	=	·008333	+	„
3 „	=	·0125		„
4 „	=	·016666	+	„
5 „	=	·020833	+	„
6 „	=	·025		„
7 „	=	·029166	+	„
8 „	=	·033333	+	„
9 „	=	·0375		„
10 „	=	·041666	+	„
11 „	=	·045833	+	„
12 „	=	·05		„

Here we see that the sixpence and shilling alone can be truly represented in the new system—the former being exactly equal to 25 mils, or two cents and a half, and the latter to 5 cents, or 50 mils.

Now, it must be remembered that exchanges will have to be made between the two currencies—or, what is the same thing, payments registered in the old will have to be made in the new, either of a single coin for its corresponding value, or of a sum made up of several coins for the like corresponding value; but the single-coin payments, consisting of tolls, postages, and one or two similar charges, have been already disposed of, and we come to larger payments—such, for instance, as a workman's wages, which for our present purpose we may suppose to be 14s. 8d. a week. In such a case it will be seen that the employer must pay 733 or 734 mils ($\frac{7}{10}$ ths of a mil too much, or $\frac{3}{10}$ ths of a mil too little); that is to say, that about one fourteen-hundredth part of such a week's wages is thus placed in jeopardy. Had the wages been half the amount we

have supposed, then about one seven-hundredth part of them might be lost or gained in this way; and so on, the proportion increasing as the sum to be paid diminishes. Now, it is well known that the poorer class of persons have very few payments to make at all of a recurring kind; and so we arrive at the conclusion that in their case the inconvenience arising on this head will scarcely ever occur, and that, when it does, it will be wholly insignificant. But Mr. Minasi contrives to magnify the difficulty on this head in a very ingenious manner. He first assumes a price at an inconvertible rate; then translates the rate, of necessity inaccurately, into the new coinage; and, multiplying this last 9,000 times, discovers that the product is so much in excess or deficiency of what it would be if the original rate had been multiplied instead. Thus he supposes 9,000 articles on sale at 10s. $2\frac{1}{2}d.$, and, on Professor De Morgan's authority, which he quotes for the purpose, represents that rate by 511 mils: but 9,000 times 511 mils amount to £4,599, whereas 9,000 times 10s. $2\frac{1}{2}d.$ would amount to £4,593. 15s. only; "and thus," says Mr. Minasi, "an error of no less than five guineas would arise in such a case." Mr. Minasi may rest assured that very few people would go to work in that way. So long as any article is quoted at a price in the old currency, that rate will be dealt with. Ten pounds of sugar at 10d. a pound will be ten times 10 pence, not ten times 41 mils. But the shopkeeper, for his own interest' sake, will soon have quantities adapted to the new currency; and then, and not till then, will calculations of price be made in it. Before we are charged 250 mils for ten pounds of coffee, it will be settled that the coffee is at 25 mils a pound.

Mr. Minasi adduces several other arguments against the Committee's plan, but it will be seen that they fall to the ground on examination. Thus he shows that certain multiplications, such as £58. 17s. $1\frac{1}{2}d.$ by 35, can be performed in the ordinary way by means of a less number of figures than by making the computation decimally; but he omits altogether to take into account the time and labour which the one process occupies as compared with the other. The example is as follows—

	£.	s.	d.
58·856	58	17	$1\frac{1}{2}$
35			5
294280	294	5	$7\frac{1}{2}$
176568			7
2059·960	2059	19	$4\frac{1}{2}$

where the former calculation requires 26 figures and the latter only 22 (counting a fraction as one); but if time and labour be taken into account, there can be very little doubt which is the preferable process.

Again: quoting from a writer in the *Eclectic Review*,* who, it seems, speaks of the compound rules of addition, subtraction, multiplication, division, reduction, practice, rule of three, and vulgar fractions, disappearing from our school books, Mr. Minasi protests against any such banishment of these useful modes of calculation, and urges that, even should a decimal coinage be established, they afford the means of arriving at results more quickly "*than by decimals.*" By reference to Mr. Minasi's paper it will be seen that what he means is, that such rules as that called the rule of three will always be useful whether a decimal system be introduced or not.

The objections made by Mr. Thomson to the retention of the pound may, I think, be soon disposed of. That gentleman says—

"How would it be possible, for instance, in writing down 8·124 (8 pounds 1 florin 2 cents and 4 mils) to make it intelligible to a working man, or even one higher in the social scale, that 1 (the first decimal figure) means two shillings—for we shall still for some time count in shillings; that 2 (the second decimal figure) means two tenths of two shillings; and that 4 (the third decimal figure) means four hundredths of two shillings, or four thousandths of one pound?"

The answer to this is, that 8·124 need not, at first at all events, be written in that way, but in the manner in which pounds, shillings, and pence are now—that is, as 8·1·2·4: in which way no one could have any difficulty in understanding them, for it will not be necessary to translate them into the values of the old coinage, when we have what they represent in the new; and

* I believe, Mr. John Middleton Hare, Jun., B.A., of St. John's College, Cambridge—the author also of a very able letter on the subject, addressed to the Chancellor of the Exchequer. The following paragraph, which occurs in his letter, very happily exposes the kind of arguments occasionally brought forward by the opponents of the Committee's plan:—

"The next comparison is the most ludicrous of any, and one that it could scarcely be conceived possible for anyone to have had the rashness to put forward. I give it word for word as it occurs.

" 'The pound, florin, cent, and mil scheme requires an abstruse decimal system of calculation, difficult to be comprehended by the less informed, and involving great risk of error in its use. The pound, tenpenny, and penny scheme does not even require a decimal notation, except when a less sum than a penny is required, and except where wanted in calculation that may be marked or not by a vulgar fraction.'

This would seem to be hardly a fair comparison, following as it does one which describes the Committee's plan as unworthy of the name of decimal . . . It is most amusing to find the tenpenny scheme recommended because it does not require a decimal notation, whereas it is this very decimality that is so much desired, and that will produce so many benefits. But is it not absurd that any proposed scheme calling itself a decimal one should adduce as a circumstance in its favour that vulgar fractions may be still used under it?"

Mr. Thomson appears to forget that each coin will eventually have its value marked upon it, as a mil, a cent, a florin, &c., and that the correspondence between the coins themselves and a statement of them on paper will thus be complete. His objection that the cent will be inconveniently small has more weight. The three-penny piece is, as he says, apt to slip through our fingers; but this is, perhaps, merely owing to our not being long accustomed to small silver coins, and a remedy for the inconvenience might be found in making the cent a little thinner and larger.

Mr. Ryley says—

“1. Our objection to the denominations of pounds, cents, and mils, is, that it is using up for purposes of account names which have a larger signification. This is Professor De Morgan's objection to cents and mils. We wonder that so acute an observer did not perceive, and that so candid a speaker did not say, that the same objection applies to the pound, which continually necessitates the use of the qualification ‘sterling.’ The pound is, besides, a very heavy and high denomination for the unit—very much, out of all measure, higher than is in use in other countries. Moreover, as no one would propose to carry its decimals further than the third place of figures, it does not offer so many facilities for approximating the payments of very small sums in the existing coinage to their nearest equivalents in the new as would be afforded by the selection of a lower unit, divided similarly into thousandths.

“2. It involves the use of the florin, which, with the retention of the shilling, under the designation of the half-florin, or 50-mil piece, will very greatly impede the thorough introduction of a really decimal system into the thoughts and language of the people.”

I think it will be admitted by Mr. Ryley himself that these are not very formidable objections. It has been shown over and over again, and with particular force by Mr. Brown, the chairman of the Decimal Association (to whose exertions in this movement, success, if it be attained, will be mainly attributable), that the attempt to introduce and preserve a similarity between the coins of this and other countries is quite hopeless, and that it would be useless could we achieve it. The pound, being so valuable, is an equivalent for a great many other coins, and hence a vast deal of labour is saved to those engaged in the actual manipulation of money. As regards the value of the coin which is to occupy the third place in the decimal rank, it is less than that now having the place of least value, and is therefore, so far, an improvement in the present system. The change in the thoughts and language of the people will no doubt be slow; but that is unavoidable, whatever system be adopted. Nevertheless it must, I think, be admitted, that the florin is already beginning to familiarize itself,

and that it is not at all uncommon, even now, to hear it quoted in naming the price of things. Moreover, the decimal system would obtain quite independently of the conditions which Mr. Ryley seems to consider necessary. It is likely that hereafter five-mil pieces and five-cent pieces would be combinations in more request than any others; but the accounting decimally would still go on, and there would still be always coins in use corresponding with those of account. It is not essential that these last should be the most popular.

Amongst the anonymous objectors to the plan of the Committee, none have been more active than some gentlemen of the press in Liverpool, who also greatly favour Mr. Rathbone's views. One of these writers, in an article which appeared about the time of the meeting of the British Association in that town, remarks that

"Amongst the changes necessary for the introduction of the proposed system would be the revision and alteration of the whole of the taxation based on the penny—namely, the income tax, the customs rates, the rates of tolls granted by Act of Parliament to railway companies, bridges, highways, &c. &c."

Now nothing can exhibit more forcibly the reckless manner in which objections are brought forward than this, or the facility with which the public mind may be misled on the subject. The objection at first appears to be a serious one, but a moment's consideration will suffice to show that it is entirely without foundation. Thus the income tax, it is true, is assessed at so many pence in the pound; but this is merely a mode of expressing that it is to be levied at a certain rate per cent.; so that, under the present arrangement of sixteen pence in the pound, we arrive at the charge by taking one twentieth of the sum taxed and adding a third of the quotient to itself—an operation more easily performed with a decimal system than with the present one. Thus, if we suppose £100. 12s. 6d. to be the income, one twentieth of this is equal decimally to 5.031; and adding the third, we get for the result 6.708 for the amount of the tax, which is simply one fifteenth part of the income, the rating of which is altogether independent of any such changes as those under discussion. The same may be said as to other kinds of taxation "based on the penny"; for the most part they are merely per centages—or, in other words, a certain definite portion of the amount taxed—and need not, in this point of view, be affected by any alteration in our present monetary system.

I believe I have now noticed most of the principal objections to

the plan proposed by the Committee—with exception, perhaps, of one very constantly dwelt upon by all who oppose it, and that is, the necessity for calling in at once all the copper coinage, and such silver pieces as would be no longer part of the decimal system. So far from there being a necessity to do this, it is, as it seems to me, of great importance that it should not be done for a considerable time. In fact, the present coinage, or much of it, might remain, without any prejudice to the new arrangements, till it became necessary to withdraw it on the score of its being worn out; or, at all events, the process might be so gradual as to be almost imperceptible; and when thus spread over a good many years, such a process could not be regarded as an expensive one. As I have already said, the change must in its nature occupy a very considerable time, and will be for that reason the less felt.

From what has been said, it will be seen that the number of opposing writers (for, with the exception of Mr. Milward, Mr. Davidson, and some anonymous gentlemen, I believe I have noticed nearly all) is not very great, and that the difficulties as represented by them are not very formidable. Into the arguments directly in favour of the change I do not propose to go: suffice it to say, that it is recommended by a host of persons of great intelligence, amongst whom may be numbered some of the profoundest thinkers, and men having the widest range of knowledge and experience of this or any age. Considering, indeed, what a phalanx of ability they represent, the length of time during which they have digested the proposed innovation, and the unanimity with which they join in the recommendation of it—it is somewhat surprising that a Government which has with the easiest *nonchalance* issued several descriptions of coins nobody ever asked for, should look with such coyness on the small request now so powerfully supported—viz., that they would issue simply two more comparatively insignificant pieces to complete a system which they themselves have initiated, and which, without such addition, is altogether imperfect and inoperative. Our threepenny and fourpenny coins were issued, it is to be presumed, for the sake of public convenience; and the same plea will surely justify the introduction of the cent and mil, even were the more cogent reasons for such introduction altogether wanting.
